

## **Meteoroid-Induced Anomalies on Spacecraft**

William J. Cooke

[William.j.cooke@nasa.gov](mailto:William.j.cooke@nasa.gov)

NASA Meteoroid Environments Office

Many programs/projects use a simple meteoroid environment based on Grun's 1985 paper or the old NASA space station spec in their design and risk assessments. These models, which are omni directional and mono-velocity, bear little resemblance to the actual meteoroid environment, which is sun-fixed, very directional, and which has a complex speed distribution varying by source and particle size. As a result, the simple meteoroid models lead to estimates that underestimate the spacecraft/vehicle risk by a factor of 2 or more. In addition, programs often over-emphasize the risk posed by meteor showers, which typically account for less than ten percent of the meteoroid risk over the vehicle lifetime. Fueled by popular media, the emphasis on meteor showers (the risks from which can usually be mitigated operationally) can lead to ambivalence to the real risk driver, which is the sporadic background.